UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/588,492	06/06/2000	William G. Tuel JR.	POU919990100US1	9151

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EXAMINER
BANANKHAH, MAJID A

ART UNIT	PAPER NUMBER
2127	

DATE MAILED: 10/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>02 July 2004</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-48</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-48</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

1.   This office action is in response to amendment filed on July 2, 2004. Applicant's

argument has been fully considered but they are not deemed to be persuasive. Claims 1-

48 are currently pending in the application and are presented for examination.

2.   The text of those sections of Title 35, U.S. code not included in this office

action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

Claims 1, 13, 25, and 37 are rejected under 35 U.S.C. 112, second paragraph, as

being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention.

The amended claims 1, 13, 25, and 37 recite the limitation of "executing said

awakened thread which processes the received message and test to see if any thread are

ready to run". This step is vague because it is unclear why when the threads which are

awakened and are executing, they are being tested to see whether they are ready to run.

The dependent claims 2-12, 14-24, 26-36, and 38-37 are rejected for the rejection

of their parent claims.

Claim Rejections - 35 USC § 103

4.   Claim 1-48 are rejected under 35 U.S.C. 35 U.S.C. 103(a) as being unpatentable

over Huff et al. (U.S. Pat., No. 6,457,064) in view of UNIX Internals (The New Frontiers,

Uresh Vahalia, EMC Corporation Hopkinton, MA, 1996).

Per claims, 1, 13, 25, 37 Huff teaches:

a method for efficiently dispatching threads awaiting messages in a
multi-threaded communication library comprising (col.3, lines 7-10, *invoking a thread in
a process when an input event is received*): pre-assigning threads to messages to be
received (col. 5, lines 1-5); those threads whose assigned messages have not been
received are in wait state (col. 6, lines 12-20); upon receipt of a message, awakening its
pre-assigned thread; and executing said awakened thread, thereby processing the received
message (col. 6, lines 30-37).
        The reference of Huff et al. while teaches of threads that have not received the
message are being in the wait state, fails to specifically teaches of putting to sleep those
whose assigned messages have not been received. However, it is well known in the art
that threads that are not eligible to run are typically blocked [put in sleep state], for the
reason to maximizing the efficiency of multithreading system as it is evidenced by UNIX
Internals (See page53, section 3.2.1 Kernel Threads, lines 1-9, standard synchronization
mechanism of the kernel). Therefore, it would have been obvious for one ordinary skill in
the art at the time the invention was made to put the waiting threads to sleep before they
receive their messages, for the purpose of increasing the efficiency of the multithreading
system by using standard synchronization.

Per claims 2, 14, 26, and 38 wherein the selection of the thread to be dispatched is based
on its priority as set when the thread is put to sleep, the limitation is taught by UNIX
Internals in page 63, last paragraph (*the thread scheduler selects a thread from the
queue based on priority*)

Per claims 3, 15, 27, and 39 creating a thread-specific structure for each thread, each
thread-specific structure having a ready flag and a condition variable unique to its pre-
assigned thread, creating a handle for each message to be received; and having a thread
invoke message passing logic for a particular handle, thereby associating the thread and
the message, the reference of Huff teaches of a thread specific structure a condition
unique to a pre-assigned thread (col. 5, lines 16-35).

Per claims 4, 16, 28, and 40 enqueing for a received message, a pre-assigned
thread-specific structure into a first queue; writing into said handle associated with the
message received, an identification of said thread-specific structure enqued for the

received message, and placing said thread-specific structure for the received message in the WAIT condition (col. 6, lines 12-20).

Per claims 5-6, 17-18, 29-30, and 41-42 the specifics of the thread states is explained by Huff in col. 7, lines 17-37, and 59-68, continued on col. 8, lines 1-2.

Per claims 7, 19, 31, and 43 storing said received message in the buffer identified in the associated handle for the received message (col. 4, lines 30-38).

Per claims 8-9, 20-21, 32-33, and 44-45 dequeuing thread from a queue according to FIFO or LIFO is well known in the art and by definition a queue is a data structure from which elements can be removed only in the same order in which they are inserted: that is it follows a FIFO or LIFO constraint, therefore.

Per claims 10-11, 22-23, 34-35, and 46-47 dequeuing thread from a queue according to priority is well known in the art and by definition a queue is a data structure from which elements can be removed based on FIFO, LIFO or priority assigned to the elements.

Per claims 12, 24, 36, and 48 further comprising obtaining a lock for the handle associated with said received message such that the awakened thread may process only the received message (See, Unix Internals, page 56, last paragraph).

5.   Applicant on page 13 of his remarks argues:

> "Accordingly, particularly as amended, applicants' present claims provide a method for dispatching threads in which the thread that is awakened resumes polling after it has processed the message. Thus, in the claimed invention there is no longer a need for a single dedicated polling thread. In contrast, polling is now provided as an activity which is passed from thread to thread as threads are awakened. This saves a context switch back to the polling thread when a message has been processed".

In response, it is submitted that first, as it is stated in section 3 of this office action, the last step of the claim which applicant is arguing about is vague because, it is unclear why it is tested to see if any thread is running while the thread is wakened and executing. Secondly, the broad language of the claim does not allow one to withdraw the applicant's conclusion that the "polling activity is passed from one thread to another" from the claim.

Later on page 13-14 of his remarks argues:

> "Accordingly, it is more efficient than the thread processing that is taught in either of the two cited documents. In particular, this

> *aspect of thread operation is not in any way taught, disclosed or*
> *suggested by either of the two cited documents. Furthermore, it is*
> *Noted that Huff et al. actually teach away from such a method. In*
> *this regard, it is noted that the abstract of Huff et al. states "An*
> *input polling thread in the process is enabled and is used, in*
> *conjunction with other thread-specific data, to determine which*
> *of the threads in the process has an event directed to it. That*
> *thread is then triggered to handle the input event." [Emphasis*
> *added herein.] Accordingly, it is seen that the teachings of Huff et*
> *al. employ a separate polling thread. In contrast, in the recited*
> *claims the activity of polling is passed from thread to thread. And*
> *as pointed out above, the claimed process is more efficient in that*
> *it is not necessary to switch operations from one thread to a*
> *separate thread whose sole purpose is polling for message receipt*
> *for processing by yet other threads. Therefor, it is seen that the*
> *teachings found in the patent to Huff et al. actually teach away*
> *from that which is now particularly pointed out and claimed in all*
> *of applicants' recited claims. Accordingly, it is respectfully*
> *requested that the rejection of Claims 1-48 under 35 U.S.C. 103 be*
> *withdrawn".*

In response, first the Examiner agrees that there is a separate polling thread used in the Huff's invention and an input polling thread in the process is enabled and is used, in conjunction with other thread-specific data, to determine which of the threads in the process has an event directed to it. However, the claims [independent claims in particular] in the present application do not recite this limitation. Secondly, since there is no data structure recited in the claims as to by what steps the threads are chosen after they are awakened, there is no way of drawing the conclusion that the *activity of polling is passed from thread to thread from the language of the claim.* There is no scheduler recited and therefore, it is unclear once a thread is awaked and executed the polling is passed from that thread to the next to save context switching between the active thread and a specific polling thread.

6.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure.

7.   Applicant's amendment necessitated the new ground of rejection. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

        A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL
ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS
ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS
OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY
ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH
SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY
PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED,
AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE
CALCULATED FROM THE MAILING DATE OF THE The application has been
amended as follows:
ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR
RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS
FINAL

8.   Any inquiry concerning this communication or earlier communications from the
examiner should be directed to **Majid A. Banankhah** whose telephone number is (571)
272-3770. The examiner can normally be reached on Monday – Thursday, 8:00 AM –
4:00 PM.
        If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Meng-Ai An can be reached on (571) 272-3756.
        Information regarding the status of an application may be obtained from the
patent Application Information Retrieval (PAIR) system. Status information for
published applications may be obtained from either Private PAIR or Public PAIR. Status
information for unpublished applications is available through Private PAIR only. For
more information about the PAIR system, see http://pair-direct.uspto.gov. Should you
have questions on access to the Private PAIR system, contact the Electronic Business
Center (EBC) at 866-217-9197 (toll free).

        Majid Banankhah
        10/13/04

                                                    MAJID BANANKHAH
                                                    PRIMARY EXAMINER